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Subject: INFO-HAMS Digest V89 #961
To: INFO-HAMS@WSMR-SIMTEL20.ARMY.MIL

INFO-HAMS Digest Sat, 2 Dec 89 Volume 89 : Issue 961

Today's Topics:

NASA Prediction Bulletin Format
NASA Prediction Bulletins

Date: Sat, 2 Dec 89 16:27:12 EST
From: tkelso@afit-ab.arpa (TS Kelso)
Subject: NASA Prediction Bulletin Format

As a service to the satellite user community, the following description of the NASA Prediction Bulletin's two-line orbital element set format is uploaded to sci.space on a monthly basis. The most current orbital elements from the NASA Prediction Bulletins are carried on the Celestial RCP/M, (513) 427-0674, and are updated several times weekly. Documentation and tracking software are also available on this system. The Celestial RCP/M may be accessed 24 hours/day at 300, 1200, or 2400 baud using 8 data bits, 1 stop bit, no parity.

=====
Data for each satellite consists of three lines in the following format:

AAAAAAAAAAAA
1 NNNNNNU NNNNNAAAA NNNNN.NNNNNNNNN +.NNNNNNNNN +NNNNNN-N +NNNNNN-N N NNNNN
2 NNNNN NNN.NNNN NNN.NNNN NNNNNNNN NNN.NNNN NNN.NNNN NN.NNNNNNNNNNNNNNN

Line 1 is a eleven-character name.

Lines 2 and 3 are the standard Two-Line Orbital Element Set Format identical to that used by NASA and NORAD. The format description is:

Line 2
Column Description
01-01 Line Number of Element Data
03-07 Satellite Number
10-11 International Designator (Last two digits of launch year)
12-14 International Designator (Launch number of the year)
15-17 International Designator (Piece of launch)
19-20 Epoch Year (Last two digits of year)
21-32 Epoch (Julian Day and fractional portion of the day)
34-43 First Time Derivative of the Mean Motion
 or Ballistic Coefficient (Depending on ephemeris type)

45-52 Second Time Derivative of Mean Motion (decimal point assumed;
blank if N/A)
54-61 BSTAR drag term if GP4 general perturbation theory was used.
Otherwise, radiation pressure coefficient. (Decimal point assumed)
63-63 Ephemeris type
65-68 Element number
69-69 Check Sum (Modulo 10)
(Letters, blanks, periods = 0; minus sign = 1; plus sign = 2)

Line 3

Column	Description
01-01	Line Number of Element Data
03-07	Satellite Number
09-16	Inclination [Degrees]
18-25	Right Ascension of the Ascending Node [Degrees]
27-33	Eccentricity (decimal point assumed)
35-42	Argument of Perigee [Degrees]
44-51	Mean Anomaly [Degrees]
53-63	Mean Motion [Revs per day]
64-68	Revolution number at epoch [Revs]
69-69	Check Sum (Modulo 10)

All other columns are blank or fixed.

Example:

```
NOAA 6
1 11416U          86 50.28438588 0.00000140          67960-4 0  5293
2 11416  98.5105  69.3305 0012788  63.2828 296.9658 14.24899292346978
```

Note that the International Designator fields are usually blank, as issued in the NASA Prediction Bulletins.

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tkelso@blackbird.afit.af.mil	Air Force Institute of Technology

Date: Sat, 2 Dec 89 16:26:54 EST
From: tkelso@afit-ab.arpa (TS Kelso)
Subject: NASA Prediction Bulletins

The most current orbital elements from the NASA Prediction Bulletins are carried on the Celestial RCP/M, (513) 427-0674, and are updated several times weekly. Documentation and tracking software are also available on this system. As a service to the satellite user community, the most current of these elements are uploaded weekly to sci.space. This week's elements are

provided below. The Celestial RCP/M may be accessed 24 hours/day at 300, 1200, or 2400 baud using 8 data bits, 1 stop bit, no parity.

- Current NASA Prediction Bulletins #609 -

Alouette 1

1 00424U 62B-A 1 89317.91443840 .000000490 00000-0 57637-3 0 2426
2 00424 80.4646 138.2952 0024107 104.8734 255.5121 13.67236368353277

SOLRAD R/B

1 00727U 64001 A 89317.42255927 .000000358 00000-0 30346-3 0 3170
2 00727 69.9011 136.2783 0016399 267.2813 92.6432 13.93620084313886

ATS 1

1 02608U 66110 A 89324.22879469 .000000031 00000-0 99999-4 0 795
2 02608 13.3500 15.3543 0003124 329.8827 30.0758 1.00387215 459

Cos 185 R/B

1 03019U 67104 B 89324.47858724 .00014655 00000-0 98955-3 0 5022
2 03019 64.0671 337.4291 0199830 207.8519 151.1696 14.91921203128372

ATS 3

1 03029U 67111 A 89316.21324956 -.000000074 00000-0 99999-4 0 2656
2 03029 12.9261 22.9696 0018048 204.4486 155.4581 1.00272677 80627

Cosmos 398

1 04966U 71 16 A 89325.55556668 .00082800 16146-4 51181-3 0 2748
2 04966 51.5244 25.9171 2428194 126.5678 258.4011 10.72270346569089

Starlette

1 07646U 89325.19751857 -.000000038 00000-0 17394-4 0 9971
2 07646 49.8250 259.1480 0206279 224.3516 134.0691 13.82124992747015

LAGEOS

1 08820U 89325.62513735 .000000005 00000-0 00000 0 0 9317
2 08820 109.8533 284.0096 0044785 282.5909 76.9413 6.38664247 60687

GOES 2

1 10061U 89321.34439300 -.000000006 0 3266
2 10061 7.5371 66.3548 0007918 173.9133 185.9586 1.00276382 6914

GPS-0001

1 10684U 89323.52063938 0.000000009 10000-3 0 2771
2 10684 63.5493 96.0139 0113537 198.4221 161.1371 2.00558683 71641

GPS-0002

1 10893U 89323.98405768 -.000000026 0 643
2 10893 64.4698 336.8821 0156203 27.0450 333.7961 2.00551614 84475

GOES 3

1 10953U 89320.39403794 0.000000079 10000-3 0 7671
2 10953 6.4027 69.0551 0007118 237.5007 122.2646 1.00288497 2460

SeaSat 1

1 10967U 78064 A 89318.05401248 .000002876 00000-0 10497-2 0 1944
2 10967 108.0078 236.3829 0002812 253.2778 106.8116 14.35058687595581

GPS-0003

1 11054U 89323.29298118 -.000000026 0 1197
2 11054 64.0085 333.2779 0055166 120.0226 240.5587 2.00563890 81470

GPS-0004

1 11141U 89323.38898979 0.000000009 0 2321

2 11141 63.6230 95.9282 0056184 319.0437 40.5149 2.00566405 80173
 NOAA 6
 1 11416U 89324.95022664 0.00002444 10352-2 0 9326
 2 11416 98.5136 317.5876 0006900 69.0491 291.1458 14.26225126540244
 GPS-0005
 1 11690U 89319.53619776 0.00000010 0 8663
 2 11690 64.1031 98.0177 0109641 203.0204 156.4641 2.00558192 85954
 Solar Max
 1 11703U 89333.28573386 0.01965931 -97878-5 70539-3 0 2225
 2 11703 28.4859 163.4663 0002458 342.8745 17.2349 16.23701334545809
 GPS-0006
 1 11783U 80 32 A 89324.84201281 -.00000026 00000-0 00000 0 0 9937
 2 11783 63.8133 332.8516 0142282 60.9003 300.5501 2.00570929 70141
 GOES 4
 1 11964U 89323.05794969 -.00000168 0 1036
 2 11964 5.8554 72.9182 0035699 100.4551 259.8028 0.99232377 3567
 GOES 5
 1 12472U 89324.23594772 -.00000246 10000-3 0 7759
 2 12472 2.9368 78.5205 0001473 358.3304 1.6748 1.00259595 30155
 SME
 1 12887U 81100 A 89325.00021043 .00039849 00000-0 11254-2 0 3771
 2 12887 97.6703 356.8509 0002985 59.7004 300.4481 15.36251894449163
 Meteor 2-08
 1 13113U 89322.85137863 0.00000486 42698-3 0 6776
 2 13113 82.5347 295.8180 0015963 355.0361 5.0719 13.84084606386638
 Salyut 7
 1 13138U 89325.36790486 0.00043347 78950-3 0 8852
 2 13138 51.6084 264.1200 0001690 102.2687 257.7471 15.49038935432491
 Cosmos 1383
 1 13301U 82 66 A 89324.84307127 .00000304 00000-0 34638-3 0 5202
 2 13301 82.9281 93.4709 0028494 17.2548 342.9652 13.67773781369195
 LandSat 4
 1 13367U 82 72 A 89317.78339859 .00004093 00000-0 91726-3 0 1603
 2 13367 98.1957 19.1950 0003773 83.8186 276.3475 14.57149960389932
 Meteor 2-09
 1 13718U 89324.91749209 0.00000731 37843-3 0 8332
 2 13718 81.2429 128.2176 0055082 273.7163 85.7720 14.13374639357694
 IRAS
 1 13777U 83 4 A 89317.32383283 .00000487 00000-0 36278-3 0 6928
 2 13777 99.0319 152.3341 0011887 258.1056 101.8776 13.98672545 16769
 Cosmos 1447
 1 13916U 83 21 A 89325.07446472 .00000273 00000-0 27822-3 0 6617
 2 13916 82.9469 165.9007 0039260 1.0348 359.0875 13.73978341334096
 TDRS 1
 1 13969U 83 26 B 89323.24381717 -.00000207 00000-0 00000 0 0 8791
 2 13969 3.9541 67.5315 0003780 191.5738 168.2128 1.00268350 90979
 GOES 6
 1 14050U 89321.43740718 0.00000107 0 376

2 14050 1.6853 80.7949 0002628 187.1324 172.3186 1.00294219 8145
 OSCAR 10
 1 14129U 89314.29317270 -.000000098 0 4400
 2 14129 25.9127 234.8118 6026858 92.0075 333.6040 2.05884293 20226
 GPS-0008
 1 14189U 89323.93456325 0.000000009 10000-3 0 6781
 2 14189 63.2607 94.4538 0140039 215.5174 143.5148 2.00563231 46563
 Meteor 2-10
 1 14452U 89322.03868114 0.00001362 57848-3 0 7883
 2 14452 81.1599 139.3450 0095745 13.8210 346.5580 14.22442937314413
 LandSat 5
 1 14780U 84 21 A 89324.88438843 .00002527 00000-0 56974-3 0 9818
 2 14780 98.1480 23.9581 0003991 105.7801 254.3764 14.57168785304385
 UOSAT 2
 1 14781U 89325.58664471 0.00004772 90907-3 0 5554
 2 14781 97.9823 19.7178 0012257 180.4703 179.6486 14.64441216305578
 LDEF
 1 14898U 89330.03348973 0.00094819 80326-3 0 588
 2 14898 28.5005 105.0203 0003038 35.0326 325.0377 15.68185889316710
 GPS-0009
 1 15039U 89323.99521021 0.000000008 0 7659
 2 15039 63.0108 93.6752 0016373 244.4601 115.3605 2.00563145 39842
 Cosmos 1574
 1 15055U 84 62 A 89324.10666844 .00000265 00000-0 27308-3 0 8015
 2 15055 82.9559 216.3959 0026735 182.6915 177.4114 13.73296355271375
 Meteor 2-11
 1 15099U 89322.25822618 0.00000664 59042-3 0 9800
 2 15099 82.5305 243.8220 0012800 159.4915 200.6765 13.83742201271428
 GPS-0010
 1 15271U 89323.89407914 -.000000026 0 7280
 2 15271 63.3087 332.5491 0103906 322.1026 37.1998 2.00569856 36958
 Cosmos 1602
 1 15331U 84105 A 89317.16164757 .00006458 00000-0 92093-3 0 1144
 2 15331 82.5402 200.8673 0022781 322.7812 37.1847 14.76473663276199
 NOAA 9
 1 15427U 89325.28641771 0.00001460 81346-3 0 4543
 2 15427 99.1571 315.4504 0014383 230.6662 129.3234 14.12303317254638
 Meteor 2-12
 1 15516U 89321.12885400 0.00000513 44968-3 0 1319
 2 15516 82.5377 183.1076 0017882 47.8260 312.4412 13.84219396242215
 Cosmos 1686
 1 16095U 89325.88405026 0.00012410 23259-3 0 4177
 2 16095 51.6112 261.5657 0002876 127.2423 233.0032 15.49051952233670
 GPS-0011
 1 16129U 89323.55358535 0.000000009 0 3668
 2 16129 63.8021 94.5162 0120901 149.8446 210.8424 2.00561687 30152
 Meteor 3-1
 1 16191U 85100 A 89314.91927952 .000000044 00000-0 99999-4 0 8740

2 16191 82.5430 132.0124 0018864 295.2548 64.6622 13.16881860194830
Meteor 2-13
1 16408U 89324.46100369 0.00000427 37290-3 0 5480
2 16408 82.5323 95.3229 0015060 220.1392 139.8657 13.84246016197174
Mir
1 16609U 89325.34718580 0.00027676 39945-3 0 2246
2 16609 51.6226 295.0502 0004317 61.5297 298.6024 15.55746353215670
SPOT 1
1 16613U 86 19 A 89324.93214145 .00001060 00000-0 51578-3 0 6742
2 16613 98.7233 37.4097 0001748 89.9771 270.1580 14.20020109 34371
Meteor 2-14
1 16735U 86 39 A 89314.99140760 .00000182 00000-0 15475-3 0 3360
2 16735 82.5374 129.7604 0014280 325.9152 34.1084 13.83987553174761
Cosmos 1766
1 16881U 86 55 A 89324.28312677 .00007345 00000-0 10522-2 0 8035
2 16881 82.5177 253.5899 0020930 316.0259 43.9281 14.76318664178310
EGP
1 16908U 86 61 A 89304.02055883 -.00000016 00000-0 18794-3 0 1554
2 16908 50.0104 240.5066 0010893 330.4310 29.5907 12.44381948146326
FO-12
1 16909U 86 61 B 89304.07884460 -.00000025 00000-0 99999-4 0 1749
2 16909 50.0168 240.6055 0010698 329.6461 30.3754 12.44402062146327
NOAA 10
1 16969U 89323.53008575 0.00001412 63943-3 0 3077
2 16969 98.6247 350.9868 0014017 155.5355 204.6507 14.23302484164781
Meteor 2-15
1 17290U 89324.19569312 0.00000688 61117-3 0 3108
2 17290 82.4678 28.6440 0011953 180.1609 179.9560 13.83810580145198
MOS-1
1 17527U 87 18 A 89324.90904302 .00000559 00000-0 44110-3 0 3186
2 17527 99.1329 34.9066 0000384 78.0101 282.2254 13.94835691140220
GOES 7
1 17561U 87 22 A 89324.12733153 -.00000047 00000-0 00000 0 0 3760
2 17561 0.1123 68.4426 0000417 171.3499 120.2206 1.00206564 3320
Kvant
1 17845U 89325.86102986 0.00072010 10202-2 0 9167
2 17845 51.6126 292.4980 0002247 71.0404 288.9508 15.55810726152023
DMSP B5D2-3
1 18123U 87 53 A 89317.92442427 .00001655 00000-0 89525-3 0 4219
2 18123 98.8191 146.4099 0013917 276.9840 82.9762 14.13680035123981
RS-10/11
1 18129U 89325.99078695 0.00000148 15195-3 0 9470
2 18129 82.9239 121.6087 0011554 340.5504 19.5176 13.72030855121038
Cosmos 1867
1 18187U 87 60 A 89324.91270451 .00000181 00000-0 10603-3 0 142
2 18187 65.0130 305.1107 0016113 252.4863 107.4385 14.29458651123527
Meteor 2-16
1 18312U 89323.32279945 0.00000218 18868-3 0 3359

2 18312 82.5525 96.6262 0013026 116.4150 243.8397 13.83544099113967
 Meteor 2-17
 1 18820U 89322.35738447 0.00000337 2923-3 0 1706
 2 18820 82.5448 158.0449 0015892 193.6871 166.3861 13.84245050 91017
 DMSP B5D2-4
 1 18822U 88 6 A 89324.33061827 .00001296 00000-0 61385-3 0 3289
 2 18822 98.6700 202.3719 0006917 146.5417 213.7095 14.21084020 93155
 AO-13
 1 19216U 89325.37399914 0.00000509 37172+0 0 536
 2 19216 57.1630 181.1796 6837538 215.6117 69.3169 2.09698722 11033
 OKEAN 1
 1 19274U 88 56 A 89324.93679394 .00003743 00000-0 54091-3 0 5665
 2 19274 82.5182 351.6222 0024217 83.1872 277.1871 14.75783271 74196
 Meteor 3-2
 1 19336U 89325.69655306 0.00000391 10000-2 0 3077
 2 19336 82.5397 64.2301 0017376 108.2763 252.0196 13.16868436 63645
 NOAA 11
 1 19531U 89321.28478105 0.00001439 81681-3 0 1633
 2 19531 98.9562 264.7074 0012434 156.7455 203.4275 14.11284483 59077
 TDRS 2
 1 19548U 88 91 B 89308.35404435 .00000131 00000-0 99999-4 0 488
 2 19548 0.0121 134.3737 0002322 92.2857 133.3404 1.00275755 3196
 Cosmos 2001
 1 19796U 89324.83480300 -.00001036 47317-2 0 2687
 2 19796 62.9159 120.0100 7190744 319.5701 4.8830 2.00592437 5626
 GPS-0014
 1 19802U 89318.07872726 0.00000016 10000-3 0 551
 2 19802 55.0784 205.8997 0062753 156.9923 203.3780 2.00560039 5439
 Meteor 2-18
 1 19851U 89326.17860735 0.00000117 10000-3 0 1050
 2 19851 82.5230 33.3889 0013190 220.9857 139.0355 13.83883381 36930
 TDRS 3
 1 19883U 89 21 B 89314.97483781 -.00000234 00000-0 99999-4 0 351
 2 19883 0.0297 7.4091 0005563 231.3475 121.3681 1.00270705 1706
 GPS-0013
 1 20061U 89321.25504722 -.00000031 0 386
 2 20061 54.6673 24.4470 0083444 169.2795 190.9511 2.00567421 3247
 Nadezhda
 1 20103U 89 50 A 89315.00353235 .00000218 00000-0 22192-3 0 479
 2 20103 82.9577 85.8279 0036678 287.4290 72.2857 13.73522549 17760
 GPS-0015
 1 20185U 89 64 A 89298.79060532 .00000015 00000-0 99999-4 0 212
 2 20185 54.9529 207.5354 0025372 139.3926 220.8319 2.00572367 5990
 Progress M
 1 20191U 89 66 A 89325.79683865 .00016728 00000-0 24423-3 0 826
 2 20191 51.6228 292.8057 0003746 63.5522 296.6729 15.55779380 14157
 Soyuz TM-8
 1 20218U 89 71 A 89325.79682808 .00030961 00000-0 44518-3 0 763

2	20218	51.6233	292.8053	0003895	66.5766	293.5918	15.55789016	12002
Cosmos 2038								
1	20232U		89322.32348737	0.000000004			0	263
2	20232	82.5710	125.8639	0010702	238.4398	121.5652	12.65099955	8208
Cosmos 2040								
1	20234U		89307.09151014	0.000000004			0	194
2	20234	82.5882	135.8634	0004530	68.7531	291.4042	12.62285197	6267
Cosmos 2042								
1	20236U		89307.10818638	0.000000004			0	190
2	20236	82.5796	135.7400	0004228	272.3400	87.7205	12.63875175	6286
1989 074G								
1	20238U		89306.41478462	0.000000004			0	136
2	20238	82.5897	136.7280	0041603	94.7788	265.8049	12.55209541	6150
1989 077B								
1	20254U		89308.19001358	0.00062423	20971-4	18788-2	0	713
2	20254	28.4380	302.8752	7197554	205.0331	88.2559	2.43068192	977
Cosmos 2046								
1	20259U		89326.86071613	0.00017745		29542-3	0	1246
2	20259	65.0309	96.5510	0010497	270.8635	89.2408	15.52083099	8721
InterCos 24								
1	20261U		89308.75277529	0.00002087		65514-3	0	1018
2	20261	82.5973	10.9293	1263681	125.3260	247.2505	12.42632663	4708
Gorizont 19								
1	20263U		89306.38348734	-.00000255		10000-3	0	468
2	20263	1.3488	276.1628	0000941	291.1377	69.4080	1.00270678	362
Maigon-2								
1	20281U		89321.23047500	-.00001059		-33552-3	0	1176
2	20281	82.5944	3.0200	1263875	97.1649	277.4407	12.42778015	6251
1989 084C								
1	20299U		89319.66030688	0.00005136		30662-2	0	296
2	20299	34.2162	136.1180	7090533	18.4605	357.8498	2.49665854	691
GPS-0016								
1	20302U		89325.44668445	-.000000031		10000-3	0	264
2	20302	54.7633	325.5243	0037512	304.5062	55.1612	2.00575131	586
1989 085B								
1	20303U		89324.58710368	0.00008650		11234-2	0	264
2	20303	35.6522	154.4783	0337925	337.1459	21.4501	14.47461557	4377
1989 085C								
1	20304U		89325.08364474	0.00163321	10792-4	15949-2	0	587
2	20304	37.7526	301.5327	5986438	226.4190	65.0844	4.17074007	1276
Meteor 3-3								
1	20305U		89324.87842109	0.000000081		19527-3	0	238
2	20305	82.5513	4.9217	0016888	127.0550	233.2099	13.15841186	3559
1989 086B								
1	20306U		89326.24293298	0.00003177		83495-2	0	414
2	20306	82.5552	3.9545	0017126	121.2901	238.9863	13.16044176	3734
IntelSat 6A								
1	20315U		89331.91798177	-.00000222		10000-3	0	175

2	20315	0.1028	41.6104	0014547	219.5625	98.6861	1.00266854	270
1989 087B								
1	20316U		89332.71436468	0.00006561			46526-2 0	315
2	20316	7.0377	182.9612	7262392	205.2392	86.4085	2.27810612	731
1989 070C								
1	20317U		89331.43691671	0.00000033			10000-3 0	163
2	20317	1.5706	287.8971	0231036	233.6073	124.4917	0.98760725	300
Cosmos 2049								
1	20320U		89333.39509557	0.00304061	47739-4	40236-3 0		320
2	20320	64.7792	210.4042	0036998	82.6155	277.9690	16.05016828	1928
COBE								
1	20322U		89332.57978897	0.00008837			59706-2 0	168
2	20322	99.0228	340.0876	0006709	196.6234	163.5005	14.00477850	1391
1989 089B								
1	20323U		89332.51561002	0.00001800			55914-3 0	70
2	20323	97.0698	339.2396	0080194	261.9242	97.2843	14.40089953	1427
1989 091A								
1	20330U		89332.34724217	-.00005491			-72557-1 0	69
2	20330	62.9978	320.3864	7374834	316.3033	4.6512	2.00600556	105
1989 091B								
1	20331U		89332.07786793	0.00778562	95925-5	14767-2 0		90
2	20331	62.8465	305.7834	0252404	120.0418	242.8870	15.62631559	672
1989 091C								
1	20332U		89333.34783980	0.01483958	36187-4	12583-2 0		111
2	20332	62.9356	300.8652	0261689	121.8549	240.8113	15.70299661	879
1989 091D								
1	20333U		89328.40020505	0.00000034			0	27
2	20333	62.9819	321.0116	7344540	316.2550	6.1800	2.04191211	29
1989 092A								
1	20334U		89333.38444496	0.00156956			24905-2 0	264
2	20334	64.9106	73.9063	0068264	222.8783	136.7102	15.49946368	696
1989 093A								
1	20335U		89333.27704876	0.00626788	15036-4	59832-3 0		100
2	20335	51.6253	255.7497	0074815	97.2573	263.7545	16.05186963	449
1989 093B								
1	20336U		89332.33733439	0.01163181	16425-4	90456-3 0		96
2	20336	51.6388	260.7148	0059635	89.8755	270.9028	16.09981799	293
1989 094A								
1	20338U		89332.46986304	0.00000028			10000-3 0	18
2	20338	62.8389	167.7630	7404340	288.0346	9.3823	1.95755488	04
1989 094B								
1	20339U		89332.97797878	0.00000096			10000-3 0	16
2	20339	62.8318	167.6371	7397165	288.0098	9.3817	1.96780354	02
1989 094C								
1	20340U	8994 C	89332.79045997	.00927809	000000-0	000000-0 0	000068	
2	20340	062.8116	166.5583	0264709	121.9754	240.8288	15.59290977000068	
1989 094D								
1	20341U	8994 D	89332.79269053	.01107644	000000-0	000000-0 0	000068	

2 20341 062.8303 166.4598 0328704 117.7996 245.7728 15.50634711000072

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